WARZYN

Report
15340.02

Landfill Cover Design
Remedial Design/Remedial Action
Source Control Operable Unit
Hagen Farm Site
Town of Dunkirk, Wisconsin

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Appendix C

Appendix C
Operation and Maintenance Plan

Landfill Cover Design Report
Remedial Design/Remedial Action
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Hagen Farm Site
Town of Dunkirk, Wisconsin

OPERATION AND MAINTENANCE PLAN
RD/RA DESIGN REPORT
LANDFILL COVER DESIGN
HAGEN FARM SITE

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1.0 INTRODUCTION

This Operation and Maintenance Plan (O&M Plan) has been prepared in conjunction with the Remedial Design/Remedial Action Design Report for the Landfill Cover Design at the Hagen Farm Site, Dane County, Wisconsin. The O&M Plan provides guide-lines for long-term maintenance of each component of the Landfill Cover Design. Post-closure care for the Landfill Cover Design elements will be performed in compliance with Wisconsin Administrative Code (WAC), Department of Natural Resources Rules of Solid and Hazardous Waste Management.

The design of the landfill cover has followed the Record of Decision, the Scope of Work, the provisions of the Unilateral Administrative Order, and the U.S. EPA Superfund RD/RA Guidance.

2.0 ELEMENTS INCLUDED IN O&M PLAN

Only those elements addressed in the Landfill Cover Design Report are included in this O&M Plan. Operation and maintenance of the *In Situ* Vapor Extraction portion of the Source Control Operable Unit and of the Groundwater Control Operable Unit will be discussed under separate documents.

A detailed description of the Landfill Cover Design is presented in the Landfill Cover Design Report. Implementation of the Construction Quality Assurance Plan (Appendix F) will document that the soil cap construction meets or exceeds construction requirements. In addition, the Specifications (Appendix B) and Design Plans (Appendix A) for the construction of the Landfill Cover Design elements will be of sufficient quality to minimize maintenance.

3.1 Soil Cap Design Elements

A multi-layer soil and geotextile cap will be constructed over Area A. The cap is designed and will be constructed according to the minimum requirements of NR 504.07 (1)-(7) WAC. In accordance with the Feasibility Study Report and the ROD, the cap design has been modified from NR 504.07 (1)-(7) WAC to include a drainage layer and associated geotextiles. The cap will have the following profile (listed from ground surface, downward).

- A minimum 0.5-foot thick vegetative layer (topsoil) that will sustain plant growth that will aid in the prevention of erosion providing protection to the remainder of the cap.
- A minimum 1.5-foot thick rooting zone layer aiding in providing protection from frost penetration and preventing roots from the vegetative layer from damaging the low-permeability portion of the cap.
- A non-woven geotextile providing filtering and separation between the neighboring soil layers.

- A minimum 1.0-foot thick drainage layer that will reduce the potential for head build-up on the low permeability layer due to high infiltration events by promoting drainage.

- A low permeability, compacted clay layer to minimize infiltration. This layer will be a minimum 2.0 feet thick and will have a maximum saturated hydraulic conductivity of 1×10^{-7} cm/sec.

A detail showing the cap profile is on Sheet No. 5, Cross Sections and Details, Drawing No. 15340-F5 in Appendix A, Design Plans.

3.2 Appurtenant Design Elements

In addition to the soil cap, the following elements will be constructed as part of the landfill cover design.

- A drainage swale, culverts, and sedimentation basin will be constructed to provide erosion protection for the surrounding property from discharges from the area of the soil cap.

- A six-foot high chain link fence topped with three-strand barbed wire will be constructed to prevent uncontrolled access and vandalism. Gates will be included for authorized access. Warning signs will be posted at 200 foot intervals along the fence and on each gate.

The location of these appurtenant structures is shown on Sheet No. 4, Proposed Final Grades, Drawing No. 15340-F4, in Appendix A, Design Plans.

Following placement of the soil cap and appurtenant design elements, disturbed areas will be seeded, fertilized and mulched.

3.0 NORMAL OPERATION AND MAINTENANCE

3.1 Operation Tasks

No tasks are required for the operation of the soil cap. The surface water management features have been designed as passive systems that do not require human involvement for normal operation. No scheduling of operation tasks is required.

As there are no tasks required for the landfill cover system, there are no anticipated operational problems.

3.2 Maintenance Tasks

Maintenance tasks for the landfill cover system will include the following.

- Restoration of soil cap.
- Vegetation establishment and cultivation.
- Sediment removal in erosion and stormwater control structures.
- Repair of erosion and stormwater control structures.

A detailed description of each activity follows.

3.2.1 Restoration of Soil Cap

Restoration of the soil cap will be required if any of the following items are identified during routine monitoring of the soil cap.

- Gullies or rills on the surface of the soil cap formed by erosion that are greater than 2 inches in depth.

- Areas of subsidence that form depressions or otherwise impair the performance of the cap in preventing infiltration.

Restoration of the cap would include placing the required soils material to achieve the original profile and requirements of the soil cap design. Vegetation would be re-established over the repaired areas. If significant erosion is expected to occur before vegetation is established, silt fences would be placed down-slope of the area under repair.

3.2.2 Vegetation Establishment and Cultivation.

Fertilizing, reseeding and mulching will be performed as required each spring to promote good vegetative growth. Based on visual inspection of vegetation, fertilizer type and application rate will be determined to meet the guide-lines provided by Section 630 of the *Wisconsin Department of Transportation, Standard Specifications* and the *Waste Management, Inc.; Landfill Vegetation Manual*.

Reseeding will be performed over areas where maintenance activities have disturbed the soil or areas greater than 8 feet in diameter where vegetation coverage is less than 75 percent. The seed mixture will be identical to that used for the original seeding unless the grass seed mixture appears to be ineffective. If required, the seed mixture will be modified in consultation with the Soil Conservation Service.

Mulching will be performed as required under the guide-lines provided by Section 627 of the *Wisconsin Department of Transportation, Standard Specifications*.

Mowing will be performed at least once during the annual growing season to inhibit the growth of detrimental plant species with penetrating roots (*i.e.*, trees with tap roots). Additional mowing will be performed if vegetation is matted down due to excessive height that would reduce the retarding of surface water run-off, or if vegetation becomes overgrown and a nuisance. Noxious weeds will be controlled with timely, approved herbicide application, through consultation with the Soil Conservation Service, and by mowing.

3.2.3 Sediment Removal in Erosion and Stormwater Control Structures

As desired, eroded sediments from the landfill cover system features will accumulate in the drainage swales and sediment basin. If reduced capacity is identified in the drainage swales, or if the level of sediment rises above the sediment storage level in the basin (El. 864.0 NGVD), the sediment will be removed by excavation. The sediment will be excavated when it is as dry as possible and dispersed uniformly over the soil cap area. Care will be taken not to damage existing vegetation. If necessary, the material will be stockpiled and vegetated, to be used for maintenance of the Site when required.

3.2.4 Repair of Erosion and Stormwater Control Structures

If damage is identified to the erosion and stormwater control structures during inspection of the site, repairs shall be made to return the structures to the originally constructed condition.

3.3 Maintenance Schedule

Table C-1 shows the minimum required frequency for maintenance activities for the landfill cover system.

Table C-1
MINIMUM MAINTENANCE FREQUENCY
Operation and Maintenance Plan, Landfill Cover RD/RA

Maintenance Activity	Minimum Frequency
Restoration of soil cap	As required
Vegetation establishment and cultivation	As required
Mowing	Minimum once during growing season
Sediment removal in erosion and stormwater control structures	As required
Repair of erosion and stormwater control structures	As required

4.0 ROUTINE MONITORING

4.1 Monitoring Tasks

Two items of the landfill cover system require monitoring for appropriate maintenance. The soil cap of the landfill should be monitored for suitable vegetative cover, absence of erosion rills or gullies, depressions, and damaging subsidence. The erosion and sediment control structures should be monitored for excess sediment, flood damage, clogging by debris, or sparse vegetation.

4.2 Required Testing

Testing of the topsoil will be performed as required by visual inspection of the vegetation to determine appropriate fertilizer and lime application rates. Testing parameters will be the same as specified for the original seeding activity.

No other testing will be required for maintenance of the landfill cover system.

4.3 Monitoring Frequency

The following schedule outlines the required monitoring frequency for each monitoring task.

Table C-2
MINIMUM MONITORING FREQUENCY
Operation and Maintenance Plan, Landfill Cover RD/RA

Monitoring Activity	Minimum Frequency
SOIL CAP	
• Suitable Vegetative Cover	Semi-annually
• Absence of erosion rills or gullies	Semi-annually
• Depressions	Semi-annually
• Damaging Subsidence	Semi-annually
EROSION AND SEDIMENT CONTROL STRUCTURES	
• Excess Sediment	Semi-annually
• Flood Damage	After major storms
• Clogging by Debris	Semi-annually
• Sparse Vegetation	Semi-annually

5.0 ALTERNATE OPERATION AND MAINTENANCE

As recommended in the *Superfund Remedial Design and Remedial Action Guidance, U.S. EPA, June 1986,* this section should address alternative operational and maintenance alternatives in case of failure of the landfill cap. No alternate operation and maintenance procedures are recommended because if the landfill cover was to fail, it would be repaired. The maintenance activities proposed for the landfill cover are sufficient to prevent failure of the cap.

6.0 SAFETY DURING MAINTENANCE

No special safety conditions are required for maintenance of the landfill cover other than caution while operating machinery and not working within the sedimentation pond while it is full of water.

7.0 REQUIRED EQUIPMENT

It is anticipated that Waste Management of Wisconsin will have a contractor perform maintenance activities for the site rather than keep equipment at the site. Maintenance activity frequency will be low enough that dedicated mowing and earth-moving equipment for the site would not be economically prudent.

8.0 OPERATION AND MAINTENANCE ANNUAL BUDGET

The following table lists anticipated maintenance, testing, and monitoring activities and the quantities, unit prices, and extensions for each, if required.

Table C-3
MAINTENANCE ANNUAL BUDGET
Operation and Maintenance Plan, Landfill Cover RD/RA

ITEM	QUANTITY	UNIT PRICE	ANNUAL COST
Cap Monitoring	72 hours	$ 50.00	$ 3,600
Cap Maintenance			
Repair & Regrade Eroded Portions of Cap (1 ac/yr, 1 ft depth)	1610 cy	$ 1.50	$ 2,415
Reseed & Mulch	2420 sy	$ 0.35	$ 850
Mowing	6 ac	$ 45.00	$ 270
Fertilize	6 ac	$ 140.00	$ 840
Clean Swales and Sediment Basin	1 L.S.	$ 500.00	$ 500
Annual O&M Report	1 L.S.	$ 6,000.00	$ 6,000
SUBTOTAL			$ 14,475
CONTINGENCY (15%)			$ 2,175
TOTAL			$ 16,650

9.0 RECORDKEEPING

Recordkeeping for the landfill cover system will consist of preparation of an annual report to be submitted to WDNR and U.S. EPA. The following items will be included in the report.

- Monitoring activities including a description of the soil cap and erosion and sediment control structures at the time of each semi-annual inspection. If additional inspections were performed due to significant storm events, the condition of the landfill cover and erosion and sediment control structures will be described for each storm-related inspection.

- Date and results of routine maintenance activities such as mowing and fertilizing.

- Date and description of activities for repairs and reseeding. The description will include the materials used and the location.

- A description of the test results for the annual topsoil testing.